



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/542,065	07/11/2005	Takahiro Fukuoka	052780	2841

38834 7590 06/29/2006

WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP
1250 CONNECTICUT AVENUE, NW
SUITE 700
WASHINGTON, DC 20036

EXAMINER

HON, SOW FUN

ART UNIT PAPER NUMBER

1772

DATE MAILED: 06/29/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/542,065	FUKUOKA ET AL.	
	Examiner	Art Unit	
	Sow-Fun Hon	1772	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 5-16 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-16 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 July 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>7/05</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

1. Claims 1, 3, 7-11, 13-14 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 4, 6-12 of copending Application No.10/542,017 in view of US 6,099,758. Although the conflicting claims are not identical, they are not patentably distinct from each other. While conflicting independent claim 1 recites only one substrate, failing to recite the second substrate, or that the liquid crystal mixture is free of an ultraviolet absorbent, US 6,099,758 teaches that forming a broad band cholesteric liquid crystal film comprising: a cholesteric liquid crystal film obtained by polymerizing a liquid crystal mixture between

Art Unit: 1772

two substrates with ultraviolet light (abstract) in the absence of an ultraviolet absorbent (entire disclosure fails to teach one), is well known to one of ordinary skill in the art.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Objections

2. Claims 9-12, 15-16 are objected to because of the following informalities:

a) Claim 9 contains the verb "laminating" which should be "laminated" in the past tense to correctly represent a product; and claim 11 contains the verb "adhering" which should be "adhered" for the same reason.

b) Claim 10, dependent on claim 9, recites "the circularly polarizing plate" of claim 8 upon which claim 9 depends. Claim 10 is clearer when rewritten as "The linear polarizer according to claim 9, wherein the circularly polarizing plate, which is the broad band cholesteric liquid crystal film, is laminated ...".

c) Claims 9-12, 15 all recite a "linearly polarizer", instead of "linear polarizer".
Claim 16 depends on claim 15.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-3, 5, 7-9, 13-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Verrall (US 6,099,758) as evidenced by Ouderkirk (US 6,573,963).

Regarding claim 1, Verrall teaches a broad band liquid crystal film comprising: a liquid crystal film obtained by polymerizing a liquid crystal mixture containing a polymerizable mesogen compound (a), a polymerizable chiral agent (b) and a photopolymerization initiator (c) between two substrates (polymerization initiator, polymerized by exposure to actinic radiation, abstract, photoinitiator, column 27, lines 49-54) with ultraviolet light (column 27, lines 49-54), and has a reflection bandwidth of at least 200 nm (column 4, lines 21-23) which is the same as 200 nm or more. Verrall teaches that the liquid crystal film has a molecular helix structure with a pitch (column 4, lines 28-30), which makes it cholesteric, as evidenced by Ouderkirk.

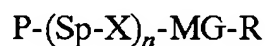
Ouderkirk teaches that cholesteric liquid crystal has a molecular helix structure with a pitch (rotates in a helical fashion with a pitch, column 4, lines 45-55).

Regarding claim 2, Verrall teaches that a pitch length in the cholesteric liquid crystal film changes so as to narrow continuously from a side (increases from a smaller value at one edge of the film to a higher value at the opposite edge of the film, column 4, lines 27-32). Although Verrall fails to disclose that the pitch length in the cholesteric

Art Unit: 1772

liquid crystal film changes so as to narrow continuously from the side irradiated with ultraviolet light, the product, as presently claimed, is the same. Even though product by process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. See MPEP 2113 [R-1].

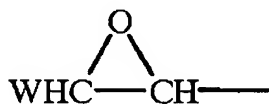
Regarding claim 3, Verrall teaches that the polymerizable mesogen compound (a) has one polymerizable functional group (ethylene or vinyl, epoxy, column 12, lines 32-45), examples of which are shown below.



I

wherein

P is $\text{CH}_2=\text{CW}-\text{COO}-$, $\text{WCH}=\text{CH}-\text{O}$,



or $\text{CH}_2=\text{CH-Phenyl-(O)}_k-$ with W being H, CH_3 or Cl and k being 0 or 1,

Verrall teaches that the polymerizable chiral agent (b) has two or more polymerizable functional groups (column 11, lines 54-55).

Regarding claim 5, although Verrall fails to disclose the molar absorption coefficient of polymerizable mesogen compound (a), let alone that it is 50 to 500

Art Unit: 1772

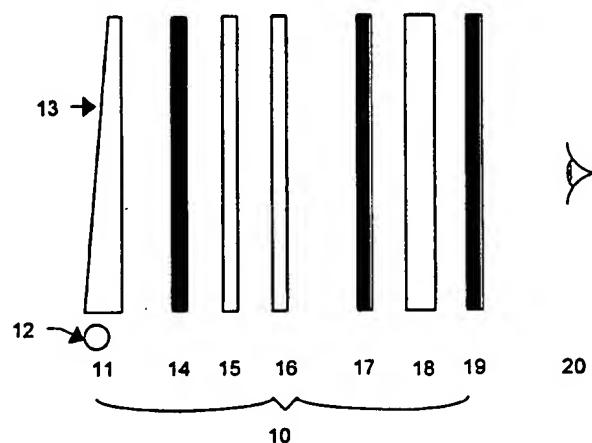
$\text{dm}^3 \cdot \text{mol}^{-1} \cdot \text{cm}^{-1}$ at 365 nm, examples (Ia) and (Id) of Verrall contain a conjugated structure of three aromatic rings, and Applicant's example also contains a conjugated structure of three aromatic rings (original claim 6), which absorb in the ultraviolet range which encompasses the 365 nm wavelength. Thus, the polymerizable mesogenic compound (a) of Verrall is expected to have a molar absorption coefficient within the claimed range of 50 to 500 $\text{dm}^3 \cdot \text{mol}^{-1} \cdot \text{cm}^{-1}$ at 365 nm.

Regarding claim 7, Verrall teaches a manufacturing method for the broad band cholesteric liquid crystal film comprising steps of: polymerizing a liquid crystal mixture containing a polymerizable mesogen compound (a), a polymerizable chiral agent (b) and a photopolymerization initiator (c) between two substrates (polymerization initiator, polymerized by exposure to actinic radiation, abstract, photoinitiator, column 27, lines 49-54) with ultraviolet light (column 27, lines 49-54).

Regarding claims 8-9, 13-16, Verrall teaches a circularly polarizing plate comprising the broad band cholesteric liquid crystal film (the light incident on the reflective polarizer is transformed into circularly polarized light, column 9, lines 65-67). Verrall teaches a linear polarizer (create linearly polarized light, column 8, line 54) comprising the circularly polarizing plate and a $\lambda/4$ plate (converts circular polarized light to linear polarized light, column 8, lines 60-63) laminated on the circularly polarizing plate (laminating QWF and the reflective polarizer together, column 9, line 5). Verrall teaches a luminaire (illumination, column 10, lines 8-15) comprising the circularly polarizing plate (inventive reflective polarizer 14, column 10, lines 51-52), which is part of the linear polarizer (reflected light redirected onto the reflective polarizer 14,

Art Unit: 1772

converted by QWF 15 and compensation film 16 into linear polarized light, column 10, lines 63-66) on a front surface side of a surface light source having a reflective layer on the back surface side thereof (backlight unit 11 with a lamp 12 and a combined light guide and reflector 13, column 10, lines 50-52); and a liquid crystal display (device 10, column 10, lines 49-50) comprising a liquid crystal cell (18, column 10, lines 55-56) on a light emitting side of the luminaire (viewer 20, column 11, line 3); in Fig. 1 shown below.

**FIG. 1*****Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

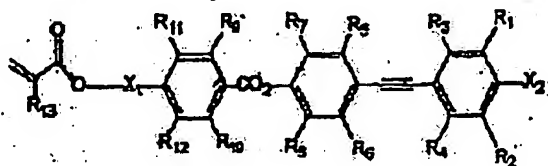
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 1772

4. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Verrall as evidenced by Ouderkirk, as applied to claims 1-3, 5, 7-9, 13-16 above, and further in view of Nakano (Abstract, formulae, JP2002308832).

Verrall as evidenced by Ouderkirk, teaches a broad band cholesteric liquid crystal film comprising: a liquid crystal film obtained by polymerizing a cholesteric liquid crystal mixture containing a polymerizable mesogen compound (a), a polymerizable chiral agent (b) and a photopolymerization initiator (c) between two substrates with ultraviolet light and has a reflection bandwidth of 200 nm or more. Verrall as evidenced by Ouderkirk, fails to teach that the polymerizable mesogen compound (a) is a compound represented by Applicant's formula (1).

However, Nakano teaches that the polymerizable liquid crystal compound shown below has large birefringence and is easily oriented (large $\Delta n/n$, abstract) to form an optical film (title of abstract).

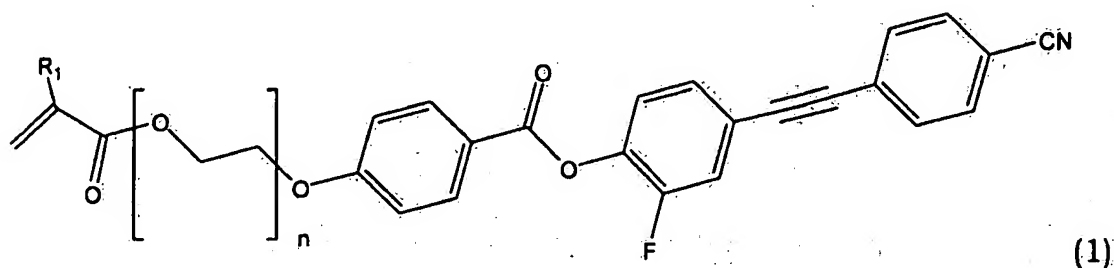


($R_1 \sim R_{12}$ は同一でも異なっても良く、 $-F$ 、 $-H$ 、 $-CH_3$ 、 $-C_2H_5$ または $-OCH_3$ 、 R_{13} は $-H$ または $-CH_3$ 、 X_1 は
 $X_1: -(CH_2CH_2O)_a(CH_2)_b(O)_c-$
 (a は0~3の、 b は0~12の整数、 c は0または1

を示し、 $a=1 \sim 3$ の時 $b=0$ 、 $c=0$ であり、 $a=0$ の時 $b=1 \sim 12$ 、 $c=1$ である。)を、 X_2 は $-CN$ または $-F$ を示す。)

Art Unit: 1772

$R_{13} = R_1$ of Applicant = hydrogen atom or methyl group (CH_3), $X_1 = (\text{CH}_2\text{CH}_2\text{O})$, $a = n$ of Applicant = 1, $R_1\text{-}R_7$, $R_9\text{-}R_{12} = \text{H}$, $R_8 = \text{F}$, $X_2 = \text{CN}$ (formula on front page of Japanese patent). See Applicant's formula (1) shown below.



wherein R_1 represents a hydrogen atom or a methyl group, and n is an integer of 1 to 5.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used a polymerizable liquid crystal compound represented by Applicant's formula (1) as a component of the polymerizable mesogen compound (a) of Verrall as evidenced by Ouderkirk, in order to provide a broad band cholesteric liquid crystal film with the desired large birefringence and ease of orientation provided by the polymerizable mesogen compound of Applicant's formula (1), as taught by Nakano.

Art Unit: 1772

5. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Verrall as evidenced by Ouderkirk, as applied to claims 1-3, 5, 7-9, 13-16 above.

Verrall as evidenced by Ouderkirk, teaches a broad band cholesteric liquid crystal film comprising: a liquid crystal film obtained by polymerizing a cholesteric liquid crystal mixture containing a polymerizable mesogen compound (a), a polymerizable chiral agent (b) and a photopolymerization initiator (c) between two substrates with ultraviolet light and has a reflection bandwidth of 200 nm or more; and a linear polarizer comprising a circularly polarizing plate comprising the broad band cholesteric liquid crystal film, and a $\lambda/4$ plate laminated on the reflecting circularly polarizing plate, as described above. Verrall as evidenced by Ouderkirk, fails to teach that that the circularly polarizing plate is laminated on the $\lambda/4$ plate so that a pitch length in the film is narrowed toward the $\lambda/4$ plate continuously.

However, Verrall teaches that the liquid crystal mixture is coated and cured directly on the $\lambda/4$ plate which serves as a substrate (column 9, lines 7-10), and that the substrate can function as a polymerization inhibitor, wherein the short pitch is on the side of the film towards the substrate with the smaller inhibiting effect if the other side of the film encounters a greater polymerization inhibitor (column 5, lines 45-53). Thus Verrall teaches that laminating the circularly polarizing plate on the $\lambda/4$ plate so that a pitch length in the film is narrowed toward the $\lambda/4$ plate continuously for the purpose of providing the desired viewing effect, is well known in the art.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have laminated the circularly polarizing plate on the $\lambda/4$

Art Unit: 1772

plate so that a pitch length in the film is narrowed toward the $\lambda/4$ plate continuously, in the linear polarizer of Verrall as evidenced by Ouderkirk, in order to provide the desired viewing effect, as taught by Verrall.

6. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Verrall as evidenced by Ouderkirk, as applied to claims 1-3, 5, 7-9, 13-16 above, and further in view of Cobb (US 6,515,785).

Verrall as evidenced by Ouderkirk, teaches the linear polarizer comprising the circularly polarizing plate comprising the broad band cholesteric liquid crystal film, and a $\lambda/4$ plate laminated on the reflecting circularly polarizing plate, as described above.

Verrall as evidenced by Ouderkirk, fails to teach that the linear polarizer further comprises an absorption polarizer adhered to the linear polarizer let alone that a transmission axis direction of the absorption polarizer and a transmission axis of the linear polarizer are arranged in parallel with each other.

However, Cobb teaches an absorbing polarizer and a reflecting polarizer laminated together and aligned for highest transmission (column 12, lines 38-46), which is when the transmission axis of the absorption polarizer (802, column 17, lines 44-46) and the reflecting polarizer (801, column 17, lines 52-53) are arranged in parallel with each other (801 is rotated to an orientation in which its transmission axis is parallel to the transmission axis of 802, column 59-62), for the purpose of providing enhanced contrast with the highest transmission (column 12, lines 30-45).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have adhered an absorption polarizer to the reflecting

linear polarizer of Verrall as evidenced by Ouderkirk, wherein a transmission axis direction of the absorption polarizer and a transmission axis of the linear polarizer are arranged in parallel with each other, in order to provide enhanced contrast with the highest transmission, as taught by Cobb.

7. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Verrall as evidenced by Ouderkirk, as applied to claims 1-3, 5, 7-9, 13-16 above, and further in view of Kameyama (US 6,088,079).

Verrall as evidenced by Ouderkirk, teaches the linear polarizer comprising the circularly polarizing plate comprising the broad band cholesteric liquid crystal film, and a $\lambda/4$ plate laminated on the circularly polarizing plate, as described above. Verrall as evidenced by Ouderkirk, fails to teach that the $\lambda/4$ plate has a Nz coefficient defined by formula $(n_x - n_z)/(n_x - n_y)$ which is within the range of -0.5 to -2.5 when the in-plane major refractive indices are n_x and n_y respectively and the major refractive index in the direction of thickness is n_z .

However, Kameyama teaches that a $\lambda/4$ plate (quarter-wavelength plate, column 10, line 16) with a Nz coefficient defined by formula $(n_x - n_z)/(n_x - n_y)$ of -0.2 to -1.2 (column 10, lines 18-24), which overlaps the claimed range of -0.5 to -2.5 , wherein n_x and n_y are the in-plane major refractive indices respectively, and n_z is the major refractive index in the direction of thickness, by convention. Kameyama teaches that the specific range of Nz values improves viewing angle characteristics by compensating for the color change with changing viewing angle (column 10, lines 14-16).

Art Unit: 1772

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have provided the $\lambda/4$ plate of Verrall as evidenced by Ouderkirk, with a Nz coefficient defined by formula $(n_x - n_z)/(n_x - n_y)$ which is within the range of -0.5 to -2.5 , in order to improve viewing angle characteristics by compensating for the color change with changing viewing angle, as taught by Kameyama.

Any inquiry concerning this communication should be directed to Sow-Fun Hon whose telephone number (571)272-1492. The examiner can normally be reached Monday to Friday from 10:00 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Pyon, can be reached on (571)272-1498. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

S. Hon.

Sow-Fun Hon

*06/26/06**Harold Pyon*
HAROLD PYON

SUPERVISORY PATENT EXAMINER

*1772**6/26/06*